NA Product
User's Manual
Firmware 5.00 and up

Last Update: December 31 2013
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Disclaimer

Zaber’s devices are not intended for use in any critical medical, aviation, or military applications or situations where a product's use or failure could cause personal injury, death, or damage to property. Zaber disclaims any and all liability for injury or other damages resulting from the use of our products.

Precautions

Zaber's motion control devices are precision instruments and must be handled with care. In particular, moving parts must be treated with care. Avoid axial loads in excess of the rated thrust load, axial and radial impact, dust and other contaminants and damage to the leadscrew thread. These will reduce the performance of the device below stated specifications.

Installation

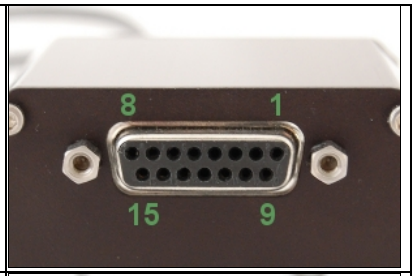
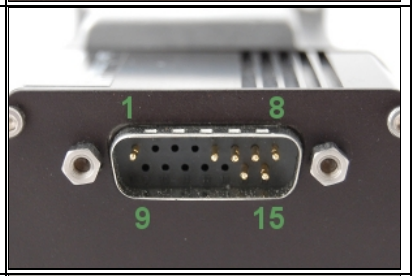
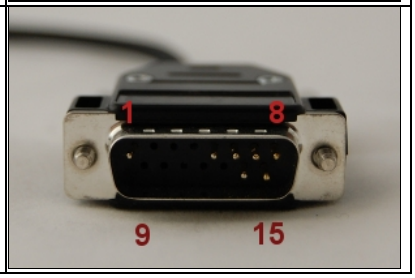
You can mount the NA actuators by the cylindrical mounting shank or by the four mounting holes on the square body section. See the NA web page for dimensions, resolution and other details.

Operation

This unit is designed to be controlled with the A-MCA series chopper drive controllers. Units produced before July 2012 with the round Minidin connectors are designed to be controlled with the older T-MCA series chopper drive controllers.

It is important to know the peripheral id of your motor. If you ever need to restore the correct settings for your device, send restore settings (command 36) to the controller with the peripheral ID as the data. This ID can also be found on the motor label as "ID XXXXX".

Pinout for D-sub 15 Connectors (A-series controllers and peripherals)

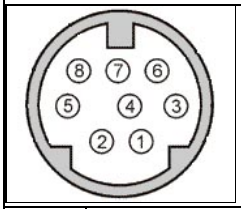
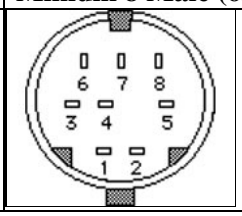
A-series controller (female)	
T3 Peripheral (male)	
T4 Peripheral (male)	

Pin #	Function
1	+5V
2	*reserved*
3	*reserved*
4	*reserved*
5	Home Sensor
6	Ground
7	Motor B1
8	Motor A1
9	+5V *
10	Encoder A *

11	Encoder B *
12	Encoder Index *
13	Ground *
14	Motor B2
15	Motor A2

** encoder embedded peripherals only*

Pin-Out for Minidin 8 (T-MCA connector and CDC6 cable to Peripheral)

Minidin 8 Female (on T-MCA)	Minidin 8 Male (on Peripheral)
	

Pin #	Function
1	Motor A1
2	Motor A2
3	Motor B1
4	Not Connected
5	Motor B2
6	+5V
7	Home Signal
8	Ground

Alternate Controllers

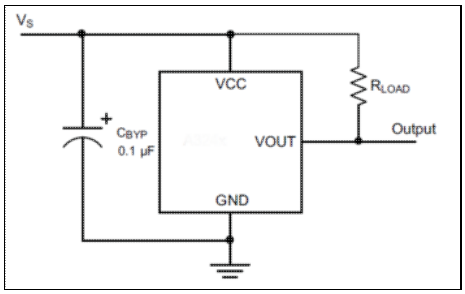
The device may be controlled by any 2-phase stepper motor controller with home sensor input. **Warning: Operating the unit without correctly wiring up the home sensor can cause permanent damage to the unit. We do not recommend using your own controller unless you are familiar with how to control a stepper motor with a hall sensor limit switch.** The following information is provided for reference only. Damage to the actuator or hall sensor due to incorrect wiring is not covered by warranty.

Home Sensor Wiring

A Hall effect sensor is mounted in the device for use as a home sensor. It is part number A1122LUA-T made by Allegro. Click here for data sheet. Your controller should be configured so the stage stops immediately (little deceleration) when the home sensor is triggered.

- Wire colour code:
  - ♦ 3.6-24 Vdc input - red
  - ♦ Home signal - yellow
  - ♦ Ground - black

The Hall sensor has an open-collector output. The default output is high impedance when the Hall sensor is not active. When the sensor detects a magnet, the Hall sensor pulls the output low to ground.



If you are not using a Zaber controller, ensure that your controller has a pull-up resistor on the output line of the Hall sensor as shown in the diagram. The bypass capacitor is optional, but may help to eliminate false triggering in noisy environments. The typical value for the pull-up resistor (R_{LOAD}) is 10k and for the bypass capacitor is 0.1uF to 1uF. The larger the capacitance, the better the noise filtering but the slower the response time.

Warranty and Repair

For Zaber's policies on warranty and repair, please refer to the Ordering Polices

Standard products

Standard products are any part numbers that do not contain the suffix ENG followed by a 4 digit number. Most, but not all, standard products are listed for sale on our website. All standard Zaber products are backed by a one-month satisfaction guarantee. If you are not satisfied with your purchase, we will refund your payment minus any shipping charges. Goods must be in brand new saleable condition with no marks. Zaber products are guaranteed for one year. During this period Zaber will repair any products with faults due to manufacturing defects, free of charge.

Custom products

Custom products are any part numbers containing the suffix ENG followed by a 4 digit number. Each of these products has been designed for a custom application for a particular customer. Custom products are guaranteed for one year, unless explicitly stated otherwise. During this period Zaber will repair any products with faults due to manufacturing defects, free of charge.

How to return products

Customers with devices in need of return or repair should contact Zaber to obtain an RMA form which must be filled out and sent back to us to receive an RMA number. The RMA form contains instructions for packing and returning the device. The specified RMA number must be included on the shipment to ensure timely processing.

Email Updates

If you would like to receive our periodic email newsletter including product updates and promotions, please sign up online at www.zaber.com (news section). Newsletters typically include a promotional offer worth at least $100.

Contact Information

Contact Zaber Technologies Inc by any of the following methods:

Phone	1-604-569-3780 (direct) 1-888-276-8033 (toll free in North America)
Fax	1-604-648-8033
Mail	1777 West 75th Ave, 1st Floor, Vancouver, BC, Canada, V6P 6P2
Web	www.zaber.com
Email	Please visit our website for up to date email contact information.

Group Specifications - NA Series

Specification	Value	Alternate Unit
Integrated Controller	No	
Encoder Type	None	
Motor Temperature Rise	75 degrees C	
Motor Steps Per Rev	200	
Motor Type	Stepper (2 phase)	
Motor Rated Power	31.2 Watts	
Motor Connection	D-sub 15	
Mechanical Drive System	Precision leadscrew	
Limit or Home Sensing	Magnetic home sensor	
Axes of Motion	1	
Vacuum Compatible	No	
CE Compliant	Yes	

Comparison - NA Series

Part Number	Microstep Size (Default Resolution)	Recommended Controller	Travel Range	Accuracy (unidirectional)
NA08A16-T4	0.047625 µm	A-MCA (24 V) Recommended	16 mm (0.630 ")	20 µm (0.000787 ")
NA08A30-T4	0.047625 µm	A-MCA (24 V) Recommended	30 mm (1.181 ")	20 µm (0.000787 ")
NA08B16-T4	0.09525 µm	A-MCA (24 V) Recommended	16 mm (0.630 ")	20 µm (0.000787 ")
NA08B30-T4	0.09525 µm	A-MCA (24 V) Recommended	30 mm (1.181 ")	20 µm (0.000787 ")
NA11B16-T4	0.09921875 µm	A-MCA (24 V) Recommended	16 mm (0.630 ")	25 µm (0.000984 ")
NA11B30-T4	0.09921875 µm	A-MCA (24 V) Recommended	30 mm (1.181 ")	25 µm (0.000984 ")
NA11B60-T4	0.09921875 µm	A-MCA (24 V) Recommended	60 mm (2.362 ")	36 µm (0.001417 ")
NA14B16-T4	0.09525 µm	A-MCA (24 V) Recommended	16 mm (0.630 ")	25 µm (0.000984 ")
NA14B30-T4	0.09525 µm	A-MCA (24 V) Recommended	30 mm (1.181 ")	25 µm (0.000984 ")

NA14B60-T4	0.09525 µm	A-MCA (24 V) Recommended	60 mm (2.362 ")	36 µm (0.001417 ")
NA23C60-T4	0.1984375 µm	A-MCA (48 V) Recommended	60 mm (2.362 ")	36 µm (0.001417 ")
NA34C60-T4	0.1984375 µm	A-MCA (48 V) Recommended	60 mm (2.362 ")	45 µm (0.001772 ")

Part Number	Repeatability	Backlash	Maximum Speed	Minimum Speed
NA08A16-T4	< 20 µm (< 0.000787 ")	< 15 µm (< 0.000591 ")	14 mm/s (0.551 "/s)	0.0004465 mm/s (0.00002 "/s)
NA08A30-T4	< 20 µm (< 0.000787 ")	< 15 µm (< 0.000591 ")	14 mm/s (0.551 "/s)	0.0004465 mm/s (0.00002 "/s)
NA08B16-T4	< 20 µm (< 0.000787 ")	< 15 µm (< 0.000591 ")	28 mm/s (1.102 "/s)	0.000893 mm/s (0.00004 "/s)
NA08B30-T4	< 20 µm (< 0.000787 ")	< 15 µm (< 0.000591 ")	28 mm/s (1.102 "/s)	0.000893 mm/s (0.00004 "/s)
NA11B16-T4	< 5 µm (< 0.000197 ")	< 18 µm (< 0.000709 ")	28 mm/s (1.102 "/s)	0.0009302 mm/s (0.00004 "/s)
NA11B30-T4	< 5 µm (< 0.000197 ")	< 18 µm (< 0.000709 ")	28 mm/s (1.102 "/s)	0.0009302 mm/s (0.00004 "/s)
NA11B60-T4	< 5 µm (< 0.000197 ")	< 18 µm (< 0.000709 ")	28 mm/s (1.102 "/s)	0.0009302 mm/s (0.00004 "/s)
NA14B16-T4	< 5 µm (< 0.000197 ")	< 20 µm (< 0.000787 ")	28 mm/s (1.102 "/s)	0.000893 mm/s (0.00004 "/s)
NA14B30-T4	< 5 µm (< 0.000197 ")	< 20 µm (< 0.000787 ")	28 mm/s (1.102 "/s)	0.000893 mm/s (0.00004 "/s)
NA14B60-T4	< 5 µm (< 0.000197 ")	< 20 µm (< 0.000787 ")	28 mm/s (1.102 "/s)	0.000893 mm/s (0.00004 "/s)
NA23C60-T4	< 5 µm (< 0.000197 ")	< 30 µm (< 0.001181 ")	50 mm/s (1.969 "/s)	0.0009302 mm/s (0.00004 "/s)
NA34C60-T4	< 10 µm (< 0.000394 ")	< 65 µm (< 0.002559 ")	30 mm/s (1.181 "/s)	0.0009302 mm/s (0.00004 "/s)

Part Number	Speed Resolution	Maximum Continuous Thrust	Linear Motion Per Motor Rev	Motor Rated Current
NA08A16-T4	0.0004465 mm/s (0.00002 "/s)	19 N (4.3 lb)	0.6096 mm (0.024 ")	400 mA/phase
NA08A30-T4	0.0004465 mm/s (0.00002 "/s)	19 N (4.3 lb)	0.6096 mm (0.024 ")	400 mA/phase
NA08B16-T4	0.000893 mm/s (0.00004 "/s)	19 N (4.3 lb)	1.2192 mm (0.048 ")	400 mA/phase
NA08B30-T4	0.000893 mm/s (0.00004 "/s)	19 N (4.3 lb)	1.2192 mm (0.048 ")	400 mA/phase
NA11B16-T4	0.0009302 mm/s (0.00004 "/s)	70 N (15.7 lb)	1.27 mm (0.050 ")	1000 mA/phase
NA11B30-T4	0.0009302 mm/s (0.00004 "/s)	70 N (15.7 lb)	1.27 mm (0.050 ")	1000 mA/phase
NA11B60-T4	0.0009302 mm/s (0.00004 "/s)	70 N (15.7 lb)	1.27 mm (0.050 ")	1000 mA/phase
NA14B16-T4	0.000893 mm/s (0.00004 "/s)	240 N (53.8 lb)	1.2192 mm (0.048 ")	570 mA/phase
NA14B30-T4	0.000893 mm/s (0.00004 "/s)	240 N (53.8 lb)	1.2192 mm (0.048 ")	570 mA/phase
NA14B60-T4	0.000893 mm/s (0.00004 "/s)	240 N (53.8 lb)	1.2192 mm (0.048 ")	570 mA/phase

NA23C60-T4	0.0009302 mm/s (0.00004 "/s)	950 N (213.0 lb)	2.54 mm (0.100 ")	1300 mA/phase
NA34C60-T4	0.0009302 mm/s (0.00004 "/s)	1450 N (325.2 lb)	2.54 mm (0.100 ")	1300 mA/phase

Part Number	Motor Winding Resistance	Inductance	Motor Frame Size	Mounting Interface
NA08A16-T4	5.1 ohms/phase	1.5 mH	08	4 M2 tapped holes 15.4 mm apart or 9mm dia smooth shank
NA08A30-T4	5.1 ohms/phase	1.5 mH	08	4 M2 tapped holes 15.4 mm apart or 9mm dia smooth shank
NA08B16-T4	5.1 ohms/phase	1.5 mH	08	4 M2 tapped holes 15.4 mm apart or 9mm dia smooth shank
NA08B30-T4	5.1 ohms/phase	1.5 mH	08	4 M2 tapped holes 15.4 mm apart or 9mm dia smooth shank
NA11B16-T4	2.1 ohms/phase	1.5 mH	11	4 M2.5 tapped holes 23 mm apart or 14mm smooth shank
NA11B30-T4	2.1 ohms/phase	1.5 mH	11	4 M2.5 tapped holes 23 mm apart or 14mm smooth shank
NA11B60-T4	2.1 ohms/phase	1.5 mH	11	4 M2.5 tapped holes 23 mm apart or 14mm smooth shank
NA14B16-T4	8.8 ohms/phase	13 mH	14	4 M3 tapped holes 26mm apart or 15mm smooth shank
NA14B30-T4	8.8 ohms/phase	13 mH	14	4 M3 tapped holes 26mm apart or 15mm smooth shank
NA14B60-T4	8.8 ohms/phase	13 mH	14	4 M3 tapped holes 26mm apart or 15mm smooth shank
NA23C60-T4	3.8 ohms/phase	10.5 mH	23	5.2 mm holes
NA34C60-T4	9.23 ohms/phase	8.8 mH	34	6.5mm hole

Part Number	RoHS Compliant	Weight
NA08A16-T4	Compliant Version Available	0.07 kg
NA08A30-T4	Compliant Version Available	0.08 kg
NA08B16-T4	Compliant Version Available	0.07 kg
NA08B30-T4	Compliant Version Available	0.08 kg
NA11B16-T4	Compliant Version Available	0.15 kg
NA11B30-T4	Compliant Version Available	0.16 kg
NA11B60-T4	Yes	0.17 kg
NA14B16-T4	Yes	0.15 kg
NA14B30-T4	Yes	0.22 kg
NA14B60-T4	Yes	0.23 kg

NA23C60-T4	Yes	0.75 kg
NA34C60-T4	Yes	2.64 kg